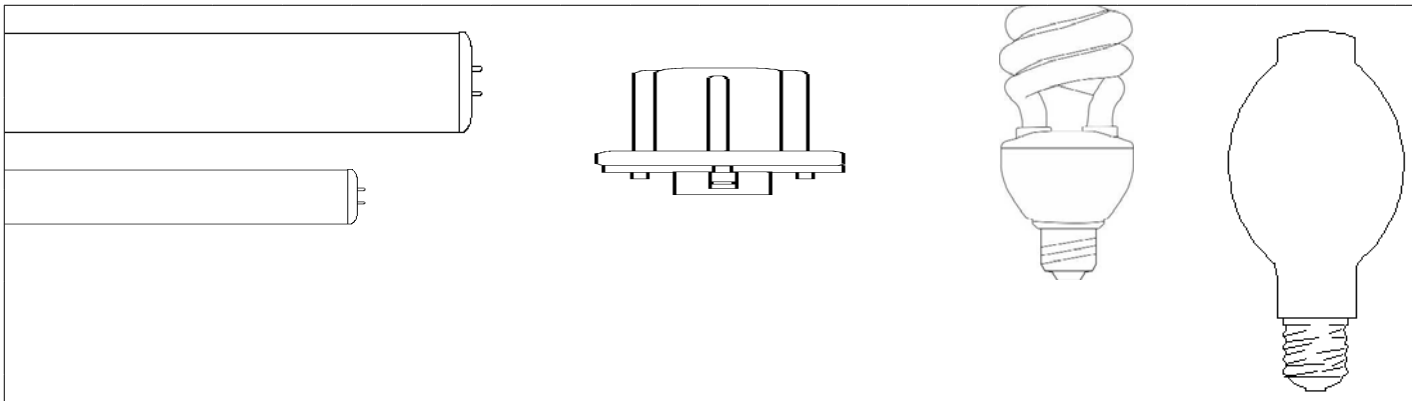


Education Plan for Massachusetts Consumers and Municipalities for the Proper Use and Disposal of Mercury-added Lamps

Provided to
Massachusetts Department of Environmental Protection
(MassDEP)

By
National Electrical Manufacturers Association
(NEMA)

Pursuant to
An Act Relative to Mercury Management
The Commonwealth of Massachusetts
Chapter 190 of the Acts of 2006, Section 6J

December 22, 2006

Table of Contents

Background

In July 2006, the Governor of Massachusetts signed into law *An Act Relative to Mercury Management.* A key element of this law is a ban on improper disposal of mercury-added products, including electric lamps.

By law (*Section 6I of the Act*), and effective May 1, 2008, "no person, household, business, school, healthcare facility or state or municipal government shall knowingly dispose of a mercury-added product in any manner other than by recycling, disposing as hazardous waste or using a method approved by the department."

Further to the disposal ban, *Section 6J (a) of the Act* requires that "no person shall sell or offer to sell or distribute a mercury-added product in the commonwealth unless the manufacturer has created and filed with the department a convenient and accessible collection plan for mercury-added products at the end-of-life, including a system for the direct return of the mercury-added product to the manufacturer or a collection and recycling plan, in accordance with chapter 21C and the department's regulations concerning hazardous waste, using new or existing collection systems."

The plan must be approved by the Massachusetts Department of Environmental Protection (MassDEP) and must be implemented by the manufacturers. In addition, per Section 6J (c), "every manufacturer of mercury-added products sold or distributed in the commonwealth shall be financially responsible for such collection and recycling systems."

Section 6J (d) (1) **describes an alternate plan for manufacturers of mercury-added lamps**, allowing them, individually or as a group, to develop an education plan for consumers and municipalities for the proper use and disposal of mercury-added lamps. Additionally, if prescribed lamp recycling targets are achieved in the Commonwealth beginning December 31, 2008, then lamp manufacturers will have fulfilled the obligations stated in Section J and will not be subject to a grant provision for Massachusetts municipalities.

This education plan is, therefore, put forward by lamp manufacturer members of the National Electrical Manufacturers Association (NEMA) in cooperation with other non-NEMA lamp manufacturers, and pursuant to *Section 6J (d) (1)* of the Massachusetts *Act Relative to* Mercury *Management.*

See **Annex A** for the full text of *Section 6J.*

Program Goals

Primary goals of the *Education Plan for Massachusetts Consumers and Municipalities for the Proper Use and Disposal of Mercury-added Lamps* are:

- To increase the lamp recycling rate in Massachusetts to specified target levels by providing appropriate educational programs for:
    - The users of mercury containing lamps,
    - Anyone who handles spent lighting products, and
    - Those who can influence lamp recycling and disposal decisions.
- To cooperate with other stakeholders in order to implement a program that builds upon existing programs, to the extent practicable
- To expand public awareness about mercury-containing lamps
- To divert mercury products from the solid waste stream
- To protect public health and the environment
- For manufacturers of mercury-added lamps to comply with applicable Massachusetts regulations

Program Partners

This education plan was developed and will be implemented by members of the National Electrical Manufacturers Association (NEMA) Lamp Section. Other manufacturers of mercury-added lamps that are not members of NEMA have been invited to participate as well. A list of participating non-NEMA companies will be provided to MassDEP by March 31, 2007.

The following companies comprise the NEMA Lamp Manufacturing Section. As of the date of submission of this plan, those marked with an asterisk (*) have confirmed their participation. Others are expected to do so as well.

- Advanced Lighting Technologies, Inc./Venture Lighting
- EYE Lighting International of N.A., Inc.
- Feit Electric Company, Inc. *
- GE Consumer & Industrial Lighting *
- Halco Lighting Corporation *
- Light Sources Inc. *
- OSRAM SYLVANIA *
- Panasonic
- Philips Lighting *
- Ruud Lighting Inc. *
- SLi Lighting
- Technical Consumer Products, Inc. *
- Ushio America, Inc. *
- Welch Allyn, Inc.
- Westinghouse Lighting Corporation

Participating lamp manufacturers have also reached out to other Massachusetts stakeholders who are critical to effective delivery of public education regarding proper use and disposal of mercury-containing lamps. Stakeholders who have agreed to offer assistance in implementing the education plan are:

- Association of Lighting and Mercury Recyclers (ALMR)
- Massachusetts Department of Environmental Protection (MassDEP)
- Associated Industries of Massachusetts (AIM)
- Region 1 U.S. Environmental Protection Agency (EPA)
- Center for Ecological Technology (CET)
- Massachusetts Executive Office of Environmental Affairs
- Massachusetts Department of Public Health

Others we intend to invite are:

- Massachusetts utilities
- Massachusetts municipal solid waste combustors
- Northeast Waste Management Officials Association (NEWMOA)
- Northeast Energy Efficiency Partnership (NEEP)
- The Massachusetts Recycling Coalition (MassRecycle)

Target Audiences

Groups in the Commonwealth who will be targeted with educational program messages regarding proper use and disposal of mercury-added lamps include the following. **Bold** type indicates priority groups for 2007. Where appropriate, trade associations representing these groups will also be targeted in order to increase message penetration and effectiveness.

- **Owners and facility managers of commercial, industrial, and retail establishments and property, including**
  - **Office buildings**
  - **Hospitals**
  - **Schools and colleges**
  - **Shopping malls**
- **State and local government agencies**
- **Lamp retailers & wholesale electrical distributors who sell lamps**
- **Contractors who install and service building lighting, including building cleaning contractors**
- Solid waste industry members
- Environmental organizations
- Specifiers of energy-efficient lighting
- Utilities
- Households/consumers

Message Content

General messages regarding mercury and energy-efficient lamps will include, but not be limited to:

- Hazards from mercury
- The role of mercury in energy-efficient lamps
- Proper handling of lamps to minimize breakage
- Massachusetts disposal requirements
- Disposal options for spent mercury-containing lamps
- Information on toll-free number, Internet website, labeling on product, labeling on packaging, and Information accompanying the sale
- Description of where and how to return, recycle or dispose of mercury-added lamps
- The meaning of the chemical symbol “Hg” and other symbols and non-English terms

Additional messages will be developed to specifically target these audiences.

See **Annex B** for examples of general messages.
See **Annex C** for examples of messages developed for target audiences and related trade associations.

Compliance, Enforcement, and Technical Assistance

An important component of our education plan is to make public that there are consequences for illegally disposing of mercury-containing lamps. NEMA Education Plan participants will support MassDEP in their efforts to ensure compliance.

Outreach Methods/Media

Web-based information

The primary information hub will be www.lamprecycle.org , with enhancements to current content, including an area devoted specifically to Massachusetts.

Upon entering the Massachusetts area of this website, a short introductory message, such as the following, will precede several links:

> *"Massachusetts has implemented regulations to increase the recycling rate of mercury-containing lamps. Mercury is a silver-white heavy metal that occurs naturally in our environment. It is liquid at room temperature and has the international chemical symbol 'Hg.' To find out more about mercury, its environmental and potential health effects, lamp recycling, labeling and other topics related to the Massachusetts regulations, visit the following:"*

[Suggested links include:]

- FAQs
- Massachusetts mercury regulations and lamp recycling contract
- Massachusetts lamp recyclers
- Message for all users of mercury-added lamps
- What everyone should know about handling mercury-containing lamps
- What you need to know if you are a
  - Business owner or facility manager
  - State and local government agency
  - Lamp retailer or wholesale electrical distributor who sells lamps
  - Contractor who installs and services building lighting
  - Member of the solid waste industry
  - Environmental organization
  - Specifier of energy-efficient lighting
  - Utility
  - Household/consumer
- Lamp industry documents
  - NEMA Lamp Recycling Policy
  - Lamp Industry Product Stewardship
  - Labeling of Mercury Containing Lamps
- Helpful (reciprocal) web links
  - http://www.mass.gov/dep/
  - http://www.epa.gov/pbt/pubs/faq.htm
  - http://www.epa.gov/pbt/pubs/accomp99.htm
  - http://www.cfsan.fda.gov/~dms/admehg3.html
  - http://www.almr.org
  - http://www.earth911.org
  - http://www.newmoa.org
  - http://www.cetonline.org/FarmBusiness/fluor_bulbrecycling.htm
- Lamp companies participating in the education plan
- Recycling success stories
- Printable posters

Radio

Public service announcements, generated by ALMR, will be reviewed and edited by lamp industry representatives and MassDEP to ensure accuracy and relevance to Massachusetts law. These announcements will be placed with regional radio stations for maximum effectiveness.

Seminars and Presentations

The lamp industry will develop in-person presentations for target audiences in Massachusetts, and will jointly deliver them with MassDEP. Certain seminars for Massachusetts businesses will be coordinated with the help of AIM. It is expected that lamp industry personnel will cover such topics as hazards from mercury, the role of mercury in energy-efficient electric lamps, proper disposal methods for mercury-added lamps, lamp labeling, and industry educational resources. It is expected that MassDEP representatives will describe the details of the Massachusetts law and the penalties for non-compliance; EPA, utilities, and recyclers/handlers will also be invited to all presentations to answer questions and hand out educational materials.

NEMA will gather information on trade shows held in Massachusetts that would be appropriate as venues for lamp recycling presentations and will seek speaking opportunities at these trade shows.

Print Media

While the main communications hub is www.lamprecycle.org , print media will play an important part in educating the public and in driving visitors to the website.

Posters will be developed for use by Massachusetts municipalities at their household hazardous waste locations and will include information on the meaning of the symbol “Hg.”

A tri-fold brochure, modeled upon the one developed by U.S. EPA for use by states, will be printed for distribution during educational seminars. This brochure will also be made available to Massachusetts wholesale distributors for their customers and will be appropriately modified for distribution through Massachusetts retailers who sell mercury-added lamps. Additionally, NEMA will seek assistance from Construction Industries of Massachusetts, Massachusetts Retailers Association, selected Chambers of Commerce, and other organizations to see that these brochures are widely distributed. The brochures will also be posted in electronic format on www.lamprecycle.org .

A template letter will be developed for distribution to Massachusetts Boards of Health, Fire Departments, and other regulators explaining the law, health concerns , and the obligation to comply with the law.

Assigned Responsibilities

Responsibilities for Education Plan outreach components are as follows:

Item	Responsible Group(s)
Website www.lamprecycle.org content and maintenance	NEMA
Public service announcements	NEMA, ALMR, and MassDEP
Seminar content and delivery	NEMA and MassDEP
Seminar scheduling	AIM
Poster for municipalities	NEMA and Region 1 EPA
Tri-fold brochure	NEMA and Region 1 EPA

Program Development Timeline

Date 2006	Task	Leader
Nov. 28	Review meeting: NEMA and DEP	NEMA
Nov. 28	Get "Mass Lamp Recycling", with the links as shown in p. 2 index, on lamprecycle.org web site	NEMA
Nov. 28	verify/correct list of NEMA Lamp Section members	NEMA
Nov. 28	Generate good list of non-NEMA mfg of mercury-containing lamps: input from D&R; also see LD&A magazine	NEMA
Nov. 28	Verify with ALMR, EPA any attributions necessary for use of LROP materials	NEMA
Dec. 14	Finalize prioritization of target audiences	NEMA
Dec. 15	Verify participation by all "other Mass stakeholders"	NEMA
Dec. 20	Non-NEMA companies invited to joint the Mass Education program	NEMA
Dec. 22	**Final plan submitted by NEMA to MassDEP**	**NEMA**
Dec. 28	Lamprecycle.org web site changes finalized	NEMA
Dec. 28	Work with AIM to schedule quarterly presentations in '07	NEMA

Program Development Timeline, continued

Date 2007	Task	Leader
Jan 12	Power point presentation drafted	NEMA
Jan 12	Draft of media plan in support of web site	NEMA
Jan 12	Draft list of presentation venues (finalized for Q1)	DEP (owner of the list); AIM to assist
Jan 26	Finalize media plan in support of web site	NEMA
Jan 26	Finalize form and content of non-NEMA, non-DEP message contributors	NEMA
Feb 28	Develop poster based on VT & other models, adapting as needed, get permission to use; same for Region 1 EPA	NEMA
Feb 28	Get EPA tri-fold; get permission and adapt if needed	NEMA
Feb 28	Work with Mass utilities to schedule one presentation to each in '07	NEMA
March 31	Develop survey for 2006 lamp sales data	NEMA
March 31	Summary report on Q1 educational presentations, with "lessons learned"	NEMA, MassDEP
June 1	Lamp sales data returned to NEMA	NEMA
June 29	Summary report on Q2 educational presentations, with "lessons learned"	NEMA, MassDEP
Sept. 28	Summary report on Q3 educational presentations, with "lessons learned"	NEMA, MassDEP
Dec. 21	Summary report on Q4 educational presentations, with "lessons learned"	NEMA, MassDEP

Program Implementation Timeline

Dates 2007	Program Item
March 31	NEMA develops survey for 2006 Mass lamp sales
June 1	2006 Mass lamp sales data due to NEMA (units)
February 1	Revised website www.lamprecycle.org launched
	Public service radio announcement #1
	Educational seminar #1
	Educational seminar #2
	Meeting with Mass waste combustors
	Public service radio announcement #2
	Educational Seminar #3
	Educational Seminar #4
	Meeting with Mass retailers
	Meeting with Mass utilities
	Meeting with Mass electrical wholesalers
Dates 2008	**Program Item**
January 31	NEMA collects 2007 Mass lamp sales data (units)
March 31	2007 Mass lamp sales data due to NEMA (units)
	Public service radio announcement #3
	Educational seminar #5
	Public service radio announcement #4
May 1	First day of Mass disposal ban
	Educational seminar #6
	Public service radio announcement #5
Dates 2009	**Program Item**
January 31	ALMR develops Mass lamp recycle survey (units)
January 31	NEMA collects Mass lamp sales data (units)
March 31	ALMR and NEMA report to DEP

Evaluation of Program Success

Measures of success for the *Education Plan for Massachusetts Consumers and Municipalities for the Proper Use and Disposal of Mercury-added Lamps* include:

- Number of Seminars
- Number of Seminar Attendees
- Number of Stakeholders
- Number of hits on the Massachusetts section of www.lamprecycle.org
- Number of tri-fold brochures distributed to wholesalers, retailers & others
- Number of municipalities offering lamp recycling services who display lamp-recycling posters at their facilities
- Number of new Massachusetts lamp recycling customers

Final evaluation of the marketing and educational effort shall be measured by the total number of marketing contacts from all sources including print, radio, website hits, and seminars.

Total effectiveness of message shall be measured by the annual Massachusetts lamp-recycling rate. If lamp-recycling targets are achieved, the program will be deemed effective and a success.

If targets are not achieved, but the lamp-recycling rate still increases substantially, the program will be viewed as successful but needing additional effort beyond education, such as increased enforcement, to further increase recycling rates.

If the lamp recycling rates fail to increase, or increase in a very modest fashion, the education program will not be considered successful.

Annex A

Full Text of *Section 6J,*

An Act Relative to Mercury Management

Enacted by the Commonwealth of Massachusetts

July 2006

Chapter 190 of the Acts of 2006

AN ACT RELATIVE TO MERCURY MANAGEMENT.

Section 6J (a) No person shall sell or offer to sell or distribute a mercury-added product in the commonwealth unless the manufacturer has created and filed with the department a convenient and accessible collection plan for mercury-added products at the end-of-life, including a system for the direct return of the mercury-added product to the manufacturer or a collection and recycling plan, in accordance with chapter 21C and the department's regulations concerning hazardous waste, using new or existing collection systems. The plan shall be approved or certified, as determined by the department, and shall be implemented by the manufacturers.
(b) Where a mercury-added component is part of another product, the collection system must provide for collection of the mercury-added component or collection of both the mercury-added component and the product containing it.
(c) Every manufacturer of mercury-added products sold or distributed in the commonwealth shall be financially responsible for such collection and recycling systems.
(d) (1) Manufacturers of mercury-added lamps shall satisfy the requirements of this section if, individually or as a group, they develop an education plan for consumers and municipalities for the proper use and disposal of mercury-added lamps. The plan shall include, but not be limited to:

(i) Information regarding the economic and environmental benefits of mercury-added lamps;
(ii) Information regarding the harms mercury can cause to the environment and to human health;
(iii) Information regarding proper disposal and recycling methods for mercury-added lamps; and
(iv) Information, provided to consumers through the use of a toll-free telephone number, internet web sites, information labeled on the device, information included in the packaging or information accompanying the sale of mercury-added lamps, describing where and how to return, recycle or dispose of mercury-added lamps. Information provided to consumers shall include the meaning of the chemical symbol "Hg" and other symbols and non-English terms.

(2) Every manufacturer, either individually or as a group, shall annually certify in writing that they are implementing the plan in accordance with this section and provide to the department the total number of mercury-added lamps sold in the commonwealth in that calendar year. The statewide mercury-added lamp recycling rates shall be 30 per cent by December 31, 2008, 40 per cent by December 31, 2009, 50 per cent by December 31, 2010, 70 per cent by December 31, 2011, and 70 per cent each year thereafter. The department shall adopt regulations to implement these rates. For the purposes of this section, the statewide mercury added-lamp recycling rate shall be based upon the total number of mercury added-lamps in the commonwealth available for recycling, as determined by the department. Every manufacturer, either individually or as a group, shall annually submit a report that identifies progress toward these recycling rates. The department shall conduct

audits, at least annually, to determine if manufacturers are complying with this section.
(e) Failure to achieve any of the recycling rates established by or pursuant to paragraph (2) of subsection (d) shall obligate the manufacturers of mercury-added lamps as a group to make available not more than $1,000,000, per year of non-compliance, to the department for grants to municipalities or regional authorities to facilitate meeting recycling rates. The department shall establish, by December 31, 2007, a process for determining the mercury-added lamp recycling rate and the aggregate and individual funding commitments based on information that includes, but is not limited to, the actual recycling rate compared with the target recycling rate, each manufacturer's lamp market share in the commonwealth and specific manufacturer program effectiveness. The department shall deposit the funds received from manufacturers into an expendable trust, in accordance with section 6 of chapter 6A and any applicable regulations, for the purpose of grants to municipalities and regional authorities and shall administer the grant program to municipalities and regional authorities. Manufacturers' individual contributions shall not exceed their respective market shares of lamps sold in the commonwealth.
(f) Nothing in this section shall prohibit retailers, distributors, wholesalers or any other group from creating and implementing a collection plan for mercury-added lamps or any other mercury-added product.
(g) This section shall not apply to mercury-added button cell batteries, motor vehicles or motor vehicle components.
(h) Mercury-added formulated products intended to be totally consumed in use, such as reagents, cosmetics, pharmaceuticals and other laboratory chemicals, shall be exempt from this section.
(i) This section shall not apply to refurbished medical equipment or products where the only mercury contained in the product comes from a removable mercury-added button cell battery or a mercury-added lamp.

Annex B

Examples of General Message Content

Annex B: General Message Content

Hazards from Mercury

Mercury is a naturally occurring element that is also released to the environment through human activities such as coal burning. Under certain conditions, mercury can change to a more complex form called methylmercury, which can accumulate in certain fish and seafood and thus become part of the human food chain. Exposure to methylmercury can lead to adverse human health effects and can be particularly hazardous to the nervous system. Public health authorities caution certain subpopulations, such as pregnant women, from consuming large amounts of fish in areas where mercury levels are known to be elevated.

The Massachusetts Department of Public Health warns women of childbearing age, children under 12, pregnant women and nursing mothers not to eat any freshwater fish caught in Massachusetts, nor to eat any shark, swordfish, tuna steak, tilefish, or king mackerel and to limit consumption of all other fish to no more than 12 oz. per week. The statewide freshwater fish advisory does not apply to fish stocked in freshwater bodies by the Massachusetts Division of Fisheries and Wildlife and does not apply to farm-raised freshwater fish sold commercially.

Mercury is a challenging pollutant to control because it transfers rather easily among air, water, and land, and can travel long distances. While it can serve many useful purposes in well-controlled applications, it constitutes a potential human health hazard. For that reason, it is important to minimize the use of mercury in products and ensure that mercury-containing products are managed appropriately at end of life. Mercury-containing lamps should be managed in accordance with disposal laws, many of which require disposal as hazardous waste or recycling. Information on how and where to recycle lamps is available at www.lamprecycle.org .

Additional information concerning mercury can be obtained at the following web sites.

http://www.state.ma.us/dph/beha

http://www.epa.gov/pbt/pubs/faq.htm

http://www.epa.gov/pbt/pubs/accomp99.htm

http://www.cfsan.fda.gov/~dms/admehg3.html

Annex B: General Message Content

Handling Small Numbers of Broken Fluorescent Lamps

Health Effects: No adverse effects are expected from occasional exposure to broken lamps; however consumers and workers should take care to minimize inhalation of mercury vapor.

Mercury: EPA's website contains the following information:

"Breaking one fever thermometer is unlikely to threaten the health of the consumer. Proper cleanup of spilled mercury and adequate ventilation can minimize the risks even further." http://www.epa.gov/glnpo/bnsdocs/hg/thermfaq.html

Since the average four-foot fluorescent lamp manufactured in 2001 contains 8 milligrams (or about 100 times less mercury than is contained in a typical 700-milligram fever thermometer) and a typical compact fluorescent lamp may contain even less mercury, lamp breakage would appear to cause virtually no risk of harm. However, laws governing the disposal of mercury-containing lamps should be followed carefully.

Phosphor: A five-year study of phosphor by the Industrial Hygiene Foundation of the Mellon Institute found no significant adverse effects, either by ingestion, inhalation, skin contact, or eye implant. Also, there have been no significant adverse effects on humans by any of these routes during the many years of its manufacture or use. The phosphor is somewhat similar to the inert calcium phosphate-fluorides that occur in nature. Phosphor is not phosphorus. Heavy metals were removed from phosphor fifteen years ago or more. Some mercury is attached to these phosphors at end of lamp life.

Universal Waste Rule Requirements: Under the EPA universal waste rule, a lamp that does not pass the TCLP test and is broken must be cleaned up and placed in a container. The container must be closed, structurally sound, compatible with lamps, and lacking any evidence of spillage. This advice is applicable to any mercury-containing lamp. In some States, Universal Waste status is lost when lamps are broken and must be handled as a full hazardous waste. It is important to check with your local, state, or federal office for the latest update in regulatory status or go to www.lamprecycle.org.

Recommended Broken Lamp Handling Practices: If lamps are broken, ventilate area where breakage occurred. Take usual precautions for collection of broken glass. Do not use a standard vacuum cleaner. Place materials in closed container to avoid generating dust.

Annex B: General Message Content

The Role of Mercury in Energy Efficient Lamps

Mercury is an essential ingredient for most energy efficient lamps. Fluorescent lamps and high intensity discharge (HID) lamps are the two most common types of lamps that utilize mercury. Fluorescent lamps provide lighting for most schools, office buildings, and stores. HID lamps, which include mercury-vapor, metal halide, and high-pressure sodium lamps, are used for streetlights, floodlights, and entertainment, sports and industrial lighting. Mercury-containing lamps also are used for medical treatment, semiconductor, integrated circuit board and other industrial production, and water and air purification.

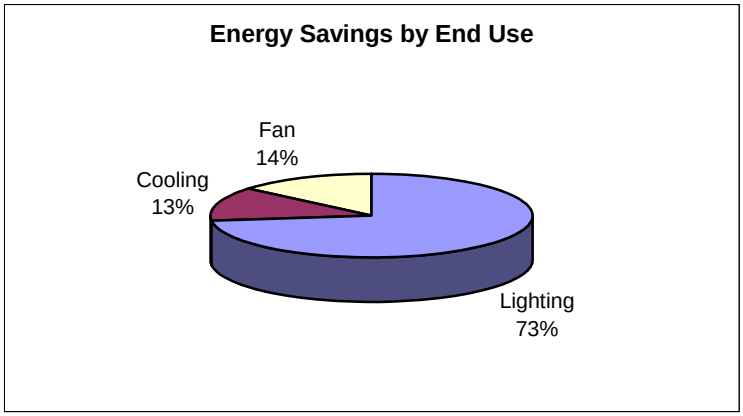
A typical fluorescent lamp is composed of a phosphor coated glass tube with electrodes located at either end. The tube contains mercury, of which only a very small amount is in vapor form. When a voltage is applied, the electrodes energize the mercury vapor, causing it to emit ultraviolet (UV) energy. The phosphor coating absorbs the UV energy, causing the phosphor to fluoresce and emit visible light. Without the mercury vapor to produce UV energy, there would be no light. Manufacturers use mercury in HID lamps for light generation, voltage control and easier starting.

A typical four-foot fluorescent lamp has an average rated life of 18,000 - 20,000 hours. Longer life lamps are rated at 24,000 to 36,000 hours depending on the lamp design, the on-off operating cycle, and the ballast used in the lighting system. To achieve this long life, lamps must contain mercury. The amount of mercury required is very small, typically measured in milligrams, and varies by lamp type, year of manufacture, manufacturing plant and manufacturer. The mercury content is critical to the lamp meeting rated specifications such as energy efficiency and lamp life.

Based on a 2001 NEMA survey, the average four-foot fluorescent lamp contains about 8.3 milligrams (mg) of mercury. This number has been steadily declining as lamp manufacturers work to reduce mercury content to the minimum amount technically feasible without reducing lamp life. Over the past 15 years, the lighting industry has achieved dramatic reductions in mercury use. Today, the average four-foot lamp contains approximately 85% less mercury than the same lamp produced in 1985.

Both fluorescent and HID lamps are typically *three to four times more energy efficient* than incandescent lamps. Through various programs, the US Environmental Protection Agency (EPA) and the US Department of Energy actively promote energy efficient lighting, such as modern fluorescent lamps. In addition, utilities promote energy efficient lamp conversions through rebate incentive programs. The use of energy efficient mercury-containing lamps can play a significant role in the nation's energy consumption. A California study concerning

the efficiency of newly constructed commercial buildings concluded that 73% of all energy savings compared to energy use in existing buildings came from the use of newer energy efficient fluorescent lighting systems.



Source: *California Non-Residential New Construction Baseline Report,* July 1999.

The use of energy efficient lighting reduces the amount of coal, oil, and gas burned in power plants, as well as the amount of air pollutants released from power plants. Mercury is a common pollutant emitted from power plants burning coal, oil, or gas. Because of the significant energy savings, the use of high efficiency fluorescent lamps to replace incandescent lamps or older fluorescent lamps results in a net *reduction* in mercury emissions.

As a result of lighting industry efforts to improve lighting efficiency such as by the development of smaller fluorescent bulb diameters (T8 and T5 lamps) and the development of compact fluorescent lamps, the lighting industry estimates that in 2003, utility air emissions were reduced by 75 billion pounds of carbon dioxide, hundreds of million pounds of nitrogen oxides and sulfur oxides, and millions of pounds of carbon monoxide, volatile organic compounds and particulate matter. [3] Other advances such as the development of ceramic metal halide lamps and pulse start metal halide lamps result in additional energy efficiency and further reduction of air pollution.

Annex B: General Message Content

Labeling of Mercury-containing Lamps

In 2003 NEMA lamp manufacturers initiated a nationwide program to label fluorescent and HID lamps that contain mercury, as well as the lamp packaging. This harmonized national approach allows for the efficient and economic distribution of energy efficient lighting.

Manufacturers indicate that a lamp contains mercury by using the international symbol for mercury, “Hg.” For most mercury-containing lamps, “Hg” inside a circle is etched onto the lamp base. For certain types that are very small, or where heat could destroy the etch, manufacturers include information on a separate flyer inside the lamp packaging. Packaging labels, using the appropriate local language, further explain that the Hg symbol indicates that the lamp contains mercury. Packaging also contains the statement “MANAGE IN ACCORD WITH DISPOSAL LAWS.”

It is sometimes difficult for consumers or businesses to find information on disposal regulations or lamp recycling options. To address this issue, NEMA maintains a website, www.lamprecycle.org, with links to disposal regulations in all states within the market area, and also a listing of lamp recycling companies.

The lamprecycle.org website URL is also included on the packaging of mercury-containing lamps, along with the manufacturer’s own toll-free customer service number.

Annex B: General Message Content

Lamp Recycling Policy
NEMA Lamp Section, November 2006

NEMA encourages businesses and consumers to voluntarily recycle their spent mercury-containing lamps.

The vast majority of fluorescent and high intensity discharge (HID) lamps contain mercury, a naturally occurring element that is also released to the environment through human activities. This mercury is an important component of the lamp, and enables the lamp to operate much more efficiently than incandescent and halogen lamps. Ironically, this higher efficiency, due in part to the use of mercury, prevents the release of much higher amounts of mercury (and many other undesirable emissions) from power plants. In other words, the use of these mercury-containing lamps actually results in less mercury being released into the environment than would occur from use of the mercury-free incandescent bulb.

Minimizing the release of mercury into the environment is desirable, and mercury-containing lamps should be managed responsibly. This means:

- Manufacturers limit their use of mercury to levels that are needed for good lamp performance. NEMA lamp manufacturers are committed to continued mercury source reduction.
- Lamps should be handled in such a way that accidental breakage (and subsequent mercury release) is minimized.
- At the end of life, spent lamps should be disposed of in a way that prevents the release of mercury into the environment. The best way to do this is to dispose of the lamp at a recycling facility that captures mercury.

The fact that lamps contain mercury does not necessarily mean that they are classified as hazardous wastes. This depends on factors such as the state the user is in, the amount of mercury in the lamp, and who is generating the spent lamp.

The benefits of recycling are:

- Recycling, along with mercury source reduction, is the most effective way to limit mercury release into the environment from using mercury-containing lamps
- More generally, recycling makes the best use (and re-use) of our natural resources
- It keeps lamps out of wholly inappropriate waste disposal streams (especially incineration)
- It is consistent with all states' permitted disposal practices

Lamp recycling is not self-supporting since spent lamps have little reclaimable components of intrinsic commercial value. The cost of lamp recycling, however, is a small portion of the energy savings from using these energy efficient lamps. Recycling also has an important societal value as it controls and contains the mercury when it no longer fulfills its important illumination function. NEMA companies support lamp recycling as one part, and an important part, of their environmental responsibility.

NEMA Promotion of Lamp Recycling

NEMA Lamp Section members have undertaken a number of efforts to encourage lamp recycling, particularly among businesses that use 85+% of all mercury-containing lamps. In year 2000, NEMA established a website, www.lamprecycle.org that provides a one-stop source for lamp recycling information nationwide. The website contains a list of recyclers as well as links to all state websites with information about spent lamp management. Lamp recyclers actively promote the use of this website.

NEMA and the Association of Lighting and Mercury Recyclers (ALMR) also developed a lamp recycling training module for the Department of Energy's Rebuild America program. The module is available free from the Department and material from the module is incorporated into the "EPA Lamp Recycling Promotion" entry at www.lamprecycling.org.

Individual companies also have their own lamp disposal promotion efforts.

Lamp manufacturers have adopted a nationwide labeling program. A standardized label on lamp packaging informs the user that the product contains mercury, and encourages the user to visit the lamprecycle.org website for lamp recycling information that applies to their jurisdiction. Since the label is also present on any replacement lamp, users are constantly reminded of their disposal obligations, without the necessity of retaining the existing packaging.

As a result of these and other efforts by all levels of government, lamp recyclers and lamp users, lamp recycling has increased from less than 10 million in 1990, to 70 million lamps in 1997, to 156 million lamps in 2003.

Annex B: General Message Content

Lamp Industry Product Stewardship
A Record of Environmental Accomplishment
NEMA, November 2006

The vast majority of fluorescent and high intensity discharge (HID) lamps (light bulbs) contain mercury, which is a naturally occurring element that is also released to the environment through human activities. This mercury is an important component of the lamp, and enables the lamp to operate much more efficiently than incandescent and halogen lamps. Government agencies actively promote the use of energy-efficient mercury-containing lamps to reduce greenhouse gas emissions. Ironically, this higher efficiency, due in part to the use of mercury, prevents the release of much higher amounts of mercury (and many other undesirable emissions) from power plants. The use of these mercury-containing lamps, instead of less efficient incandescent lamps, results in less mercury being released into the environment. At the same time, proper disposal of spent lamps can further reduce releases of mercury to the environment.

The members of the NEMA Lamp Section have a comprehensive product stewardship effort designed to produce better lighting products and systems, in a five-part program.

1. Minimize Mercury Content of Lamps
2. Increase Product Life
3. Improve Lighting Efficiency
4. Label Products, and
5. Encourage Recycling

1. <u>Minimize Mercury Content</u>

NEMA Lamp Section members have significantly reduced their use of mercury in lamps while increasing their production of lamps. In 1990, NEMA estimates that Lamp Section members used 23.6 tons of mercury in slightly less than 500 million mercury-containing lamps. This mercury usage declined to 17 tons in 1994, 13 tons in 1999, 9 tons in 2001 and 7 tons in 2003. In the same time frame sales by NEMA lamp section members have increased to 650 million mercury-containing lamps.

2. <u>Increase Product Life</u>

Manufacturers have significantly increased the product life of mercury-containing lamps. There has been a 20% increase in the life of the most common fluorescent lamps since the 1980s from 20,000 to 24, 000 hours, with some premium types at

30,000 hours. There also has been increased life of lower wattage HID lamp types. This increase in life means fewer lamps and less mercury.

3. Improve Lighting Efficiency

The lighting industry has improved lighting efficiency. Manufacturers' use of rare-earth phosphors instead of halophosphates, and development of smaller bulb diameters (T8 and T5) together with the shift to electronic from magnetic ballasts have led to a 40-50% improvement in fluorescent lighting system efficiency. This efficiency results in reduced emissions of greenhouse gases and air pollutants including mercury. The introduction of pulse-start technology and ceramic arc tubes has significantly increased efficiency of metal halide lamps. Manufacturers have also developed and promoted the use of compact fluorescent lamps to replace incandescent lamps.

4. Label Products

Lamp manufacturers have adopted a nationwide labeling program. A standardized label on lamp packaging informs the user if the product contains mercury, and encourages the user to visit the www.lamprecycle.org website for lamp recycling information that applies to their jurisdiction. Since the mercury symbol Hg is also present on replacement lamps, users are constantly reminded of their disposal obligations, without the necessity of retaining the existing packaging.

5. Encourage Recycling

NEMA lamp section members have undertaken a number of efforts to encourage lamp recycling, particularly among businesses, which use 85+% of all mercury-containing lamps. In year 2000, NEMA established a website, www.lamprecycle.org that provides a one-stop source for lamp recycling information nationwide. The website contains a list of recyclers as well as links to all state websites with information about spent lamp management. Lamp recyclers actively promote the use of this website.

NEMA and the Association of Lighting and Mercury Recyclers (ALMR) have developed a lamp recycling training module for the Department of Energy's Rebuild America program. The module is available free from the Department and material from the module is incorporated into the "EPA Lamp Recycling Promotion" entry at www.lamprecycling.org.

Individual companies also have their own lamp disposal promotion efforts. As a result of these and efforts by all levels of government, lamp recyclers and lamp users, lamp recycling has increased from less than 10 million in 1990, to 70 million lamps in 1997, to 156 million lamps in 2003.

If NEMA lamp section members had made no changes in lamps from 1990, members would be using significantly more mercury than is used today and power plants would need to generate a great deal more electricity to meet demand, resulting in increasing level of emissions from these facilities.

The average mercury-containing lamp manufactured in 1990 contained 43 mg of mercury. In 2003 that level was 11.4 mg. of mercury. If manufacturers had used 43 milligrams of mercury in each of the 650 million lamps manufactured in 2003, those lamps would have contained 31 tons of mercury rather than 7 tons, and the mercury dose per lamp has been reduced significantly since 2003.

Increased lamp life also leads to mercury reduction. Lamps are now available with a 20 to 50% increase in lamp life compared with products available in 1990. Increasing use of longer life lamps has also helped to decrease total mercury use by lamp manufacturers.

Increases in lighting efficiency result in lower emissions of greenhouse gases and air pollutants. For example:

The 150 million T8 lamps and electronic ballasts that have now replaced the older style T12 lamps save *annually* 48 billion kilowatt hours of electricity, 66.8 billion pounds of CO_2 emissions from the fossil fuel portion of the electrical generation, millions of pounds of each of the major air pollutants such as nitrogen-oxides, sulfur oxides, particulate matter, carbon monoxide, and volatile organic compounds and 1,262 pounds of mercury from that coal and oil.

The compact fluorescent lamps used in 2004 to fill 150 million “incandescent sockets” save *annually* 6.750 billion kilowatt hours of electricity, 9.4 billion pounds of CO_2 emissions from the fossil fuel portion of the electrical generation, millions of additional pounds of sulfur oxides, nitrogen oxides, particulates and carbon monoxide, and 178 pounds of mercury from that coal and oil.

The lighting industry has also achieved additional power savings and emission reductions by increasing the efficiency of other lighting products such as metal halide lamps. In summary, the lighting industry has contributed to significant reductions in the emissions of greenhouse gases, ozone and acid rain precursors, particulate matter, carbon monoxide and mercury.

Finally, lamp recycling in 2003 recovered approximately 5,720 pounds of mercury – 22% recycling rate multiplied by 13 tons of mercury used in lamps manufactured in 1999 (lamps are used for an average five-year period).

Annex C

Messages for Target Audiences

Annex C: Messages for Target Audiences

All Commercial and Industrial Target Audiences

Used mercury-containing lighting is regulated by the U.S. Environmental Protection Agency under the Universal Waste Rule[1] (UWR), and several states, including Massachusetts, have adopted regulations that are more stringent than the UWR. Most people are not aware that energy efficient lighting contains mercury and that it should be handled properly at the end of life. About 20% of spent lighting is recycled in the U.S. and 80% is still going to the municipal solid waste stream. It is important to get enough information to the right people so both mandatory and voluntary recycling increases from 20% to 40% within two years after the project is implemented. The recycling goal will be increased to 50%-60% within four years. The ultimate goal is a sustainable lamp-recycling rate of between 70 - 80% in seven years. To achieve the objective it is necessary for people's behavior to change; in other words, to increase compliance by changing the current disposal patterns for mercury-containing lamps.

NEMA members are also implementing a nationwide mercury lamp-labeling program to ensure that consumers receive consistent and clear information on the proper disposal of spent fluorescent lamps with each product they purchase. This label includes manufacturers' 800 numbers and the www.lamprecycle.org website for policy and recycling information.

Until recently, regulations have made it difficult and expensive to properly manage used lamps, and most end up in municipal landfills. Now the U. S. EPA has included mercury-containing lamps in the Universal Waste Rule (UWR), a new federal regulation that reduces the cost and regulatory burden on generators who recycle.

The Federal Rule

Summary of a 1999 federal regulation affecting fluorescent and mercury lamp handling and disposal
The Universal Waste Rule (UWR)

The Federal UWR (40 CFR Part 273) is now consistent with almost 40 state policies, which prohibit lamp disposal in municipal landfills and reduce the regulatory burden for generators who recycle lamps. The UWR creates some new definitions, exemptions and requirements for those who generate or handle lamps:

[1] **The Universal Waste Rule (UWR)** (40 CFR Part 273) See Federal Register July 6, 1999, Volume 64 Number 128, pp 36465-36490.

UW Lamp- (273.5 and 273.9) any lamp having a hazardous characteristic, not limited to mercury and including lead or other metals, can be managed as a Universal Waste. Mercury is the major concern, however, EPA encourages all handlers of spent lamps, whether hazardous or not, to manage them under the provisions of 40 CFR part 273.

Generator- anyone who creates waste mercury lamps (a RCRA characteristic waste >0.2mg/l TCLP). A generator is also considered a SQHUW or LQHUW depending on how many lamps are produced in a year. Generator requirements are found at 273.9-.14 and 273.10, 273.30

Small Quantity Handler- (SQHUW) - a generator or third party who accumulates <5,000 kg at a time, up to one year. No EPA registration is required. Training and information on handling mercury lamps and emergency procedures is required. Proper marking and labeling is required. SQHUW requirements are found at 273.10

Large Quantity Handler- (LQHUW) - a generator or third party who accumulates >5,000 kg at a time, up to one year. EPA or state registration and ID# is required. Training and information on handling mercury lamps and emergency procedures is required. Proper marking and labeling is required. LQHUW requirements are found at 273.30

Transporter- one who transports UW lamps for <10 days. No EPA Registration is required. Proper marking and labeling is required. Transporter requirements are found at 273.50

UW Transfer Facility- a non-permitted storage location for <10 days. Transfer requirements are found at 273.9

Destination Facility- a state authorized or RCRA permitted processing, recycling or disposal facility. Destination facility requirements are found at 273.60

Restrictions:

Generators, Small Quantity Handlers, Large Quantity Handlers and Transporters are not allowed to dispose of hazardous lamps into municipal landfills, and must either: 1) manage them as a fully regulated hazardous waste with all the RCRA requirements and the HW Manifest, or 2) recycle them at a permitted Destination Facility with reduced requirements and lower costs using a Bill of Lading.

Interpretation of rules for businesses/generators

UWR Basic Principles:

- Optional for Households and CESQGs (<100kg/mo total hazardous waste, including lamps). No exemption from pollution liability, however. EPA does not impose RCRA regulations on individuals and very small businesses, but it encourages all lamp generators to recycle, regardless of size. (**NOTE: states may impose more stringent requirements**).

- Prohibit all but the smallest quantities (only Households and CESQGs) from traditional municipal landfills. Require management in permitted RCRA landfills with strict limitations or by recycling at a permitted Destination Facility. This is less burdensome because most businesses will not have to register with the EPA to obtain a generator ID# or do the reporting.

- Require full regulatory compliance for hazardous waste if recycling is not chosen, including registration with the EPA, use of the HW manifest and certified HW hauler, and federal and state reporting requirements for hazardous waste landfilling at RCRA Subtitle C facility. This option could greatly increase administrative, shipping and disposal costs, as well as increasing the potential long-term environmental liability.

- Exempt whole lamps from the HW manifest requirements and allow the use of a Bill of Lading (BOL) for shipment if they are sent for recycling. Not require the analytical testing or reporting of whole lamps destined for recycling. Intentionally breaking lamps is defined as “treatment” and treatment of lamps, e.g. drum-top crushing, requires compliance with RCRA Subtitle C at an authorized facility.

- Allow the use of a common carrier instead of a certified hazardous waste hauler for shipment to a recycling facility. This lowers shipping costs.

- Allow anyone to collect lamps without any permits, provided they are taken to a Destination Facility. Allow generators and handlers to store lamps in any amount up to one year.

- Imposes minimal training and labeling requirements on generators and handlers.

For more information visit
www.lamprecycle.org

Annex C: Messages for Target Audiences

Households/Consumers

Homeowners can use local government Household Hazardous Waste (HHW) programs for lamps (and all e-waste). Household users of efficient mercury containing fluorescent lamps, including compact fluorescent lamps (CFLs), are typically exempt from special disposal requirements although a few states and localities ban homeowners from disposing of such lamps in normal household trash.

Recycling opportunities are available in many towns and cities, either at local recycling centers or transfer stations.

There may also be household hazardous waste collection events when fluorescent lamps are collected along with paints, pesticides, used motor oil etc. Contact your local waste disposal officials for details.

The US Environmental Protection Agency (EPA) has information about where to recycle lamps at http://www.epa.gov/epaoswer/hazwaste/id/univwast/where.htm including a link to Earth 911 that has recycling facilities listed by zip code.

The US EPA also has information on the significant energy efficiency benefits of using compact fluorescent lamps at http://www.energystar.gov/index.cfm?c=cfls.pr_cfls.

EPA has published a Fact Sheet on Mercury in CFLs. We are presenting highlights here for your use.

Always Dispose of Your CFL Properly

While CFLs for your home are not legally considered hazardous waste according to federal solid waste rules, it is still best for the environment to dispose of your CFL properly upon burnout. Only large commercial users of tubular fluorescent lamps are required to recycle. If recycling is not an option in your area (see below on how to find out), place the CFL in a sealed plastic bag and dispose the same way you would batteries, oil-based paint and motor oil at your local Household Hazardous Waste (HHW) Collection Site. If your local HHW Collection Site cannot accept CFLs (check www.Earth911.org to find out), seal the CFL in a plastic bag and place with your regular trash.

Safe cleanup precautions: *If a CFL breaks in your home, open nearby windows to disperse any vapor that may escape, carefully sweep up the fragments (do not use your hands) and wipe the area with a disposable paper towel to remove all*

glass fragments. Do not use a vacuum. Place all fragments in a sealed plastic bag and follow disposal instructions above.

Resources for Recycling or Proper Disposal of CFLs

NOTE: Residential recycling programs are not yet available in most regions.
1. www.Earth911.org *(or call **1-800-CLEAN-UP** for an automated hotline)**:** Online, enter your zip code, press "GO," click "Household Hazardous Waste", then "fluorescent light bulb disposal." The site will identify your nearest residential mercury recycling facility or mail disposal method. If you find no specific information on CFL disposal, go back and click on the link for "Mercury Containing Items."*
***2. Call your local government** if the Web site and Hotline number above does not have your local information. Look on the Internet or in the phone book for your local or municipal government entity responsible for waste collection or household hazardous waste.*

In conclusion, we encourage you to set up recycling programs for the spent mercury-containing lamps in your own facilities.

For more information visit
www.lamprecycle.org
or
www.almr.org

Annex C: Messages for Target Audiences

Contractors

Federal and state rules allow lamp generators and contractors to collect and accumulate lamps for recycling without a regulatory burden. This can be a business opportunity for contractors. For example:

Small Quantity Handler (SQHUW) A generator or third party (contractor) who accumulates <5,000 kg at a time, and stores them up to one year. No U.S. EPA registration is required. Training and information on handling mercury lamps and emergency procedures is required. Proper marking and labeling is required.

Large Quantity Handler (LQHUW) A generator or third party who accumulates >5,000 kg at a time, up to one year. U.S. EPA or state registration and ID# is required. Training and information on handling mercury lamps and emergency procedures is required. Proper marking and labeling is required.

Whole lamps are exempt from the Hazardous Waste (HW) manifest requirements and a Bill of Lading (BOL) with a common carrier, instead of a certified hazardous waste hauler, is allowed for shipment if they are sent for recycling. No analytical testing or reporting of whole lamps is needed for recycling. Intentionally breaking lamps is defined as "treatment" and treatment of lamps, e.g. drum-top crushing, requires compliance with RCRA Subtitle C at an authorized facility. Therefore, contractors may not crush or treat lamps.

Contractors may charge a fee to collect lamps. They can also make arrangements with any authorized recycler and may be eligible for volume discounts. Recyclers will provide a recycling certificate to the contractor, who can pass it along to the generator.

Once people realize how easy it is to get lamps recycled, more and more contractors can improve their bottom line by offering this service. Recycling is a big opportunity for contractors.

For more information visit
www.lamprecycle.org

Annex C: Messages for Target Audiences

Wholesale Electrical Distributors and Retailers of Energy Efficient Lighting

Overview

Any electrical wholesaler or retailer who sells energy-efficient lighting for buildings can assist owners with lamp recycling. This presents distributors with a new business opportunity. Recycling services, typically in partnership with a recycling company, can be a new profit center, offered as a value-added service for better customer relations. Since building owners and contractors are your key customers, it is important for you to have an understanding of the regulations that apply to these customers.

In the US, most States have adopted a less burdensome set of regulations for dealing with hazardous waste lamps, by including them in the Universal Waste Rule (UWR). If lamps are sent for recycling, this rule simplifies the storage, record keeping and transportation requirements compared to handling them as hazardous wastes.

Whole lamps are exempt from the HW manifest requirements. A bill of lading (BOL) with a common carrier, instead of a certified hazardous waste hauler, is allowed for shipment if lamps are sent for recycling. No analytical testing or reporting of whole lamps is needed for recycling.

As a distributor, if you offer lamp recycling “box programs” to your customers, and you do not accumulate or store spent lamps in your own facilities, you are not typically subject to hazardous waste regulations.

If, however, you do accumulate spent lamps in your facilities, then UWR would define you as a “Handler”, and as such:

- Accumulation- can be for up to one year
- Transportation- can be done via common carrier
- No permitting needed

More specifically, Handlers are specified as:

Small Quantity Handler- (SQHUW) - a generator or third party (contractor) who accumulates <5,000 kg at a time, and stores them up to one year. No EPA registration is required. Minimal training and information on handling mercury lamps and emergency procedures is required. Proper marking and labeling is required. SQHUW requirements are found at 273.10.

Large Quantity Handler- (LQHUW) - a generator or third party who accumulates >5,000 kg at a time, up to one year. EPA or state registration and ID# is required. Training and information on handling mercury lamps and emergency procedures is required. Proper marking and labeling is required. LQHUW requirements are found at 273.30.

Transporter- one who engages in the process of transporting UW lamps for <10 days. A transporter may not store or accumulate UW lamps. No EPA Registration is required. Proper marking and labeling is required. Transporter requirements are found at 273.50

Lighting Retrofits

As a distributor, you are frequently involved in the sale of efficient lamps for retrofits. Any lighting retrofit will generate a large number of waste lamps. These components contain some combination of mercury and lead. Environmental considerations demand that everyone involved in a lighting retrofit project pay close attention to proper disposal.

In the US, if these products classify as hazardous waste, it is the responsibility of the *owner* to manage the waste correctly; and any *contractors* involved share that *legal responsibility.* While distributors have no specific legal responsibility for end-of-life management of the lamps they sell (except for lamps in their own facilities), distributors can be influential in assisting customers with recycling options.

Other Jurisdictions

The Canadian Provinces have similar concerns about environmentally responsible lamp disposal. Lamp recyclers are also available in Canada. The www.lamprecycle.org. website has information on lamp disposal and recyclers in Canada.
Mexico has passed a version of the US UWR, which includes mercury-containing lamps. Implementation is the responsibility of the 31 States. Details are not yet available.

Lamp Breakage

While lamp breakage is of some concern to distributors (primarily if you receive shipments with broken lamps into your warehouse), the parties most concerned with this issue are your customers, the *contractors* and *owners*.

The major exposure to mercury in lamps arises from lamp breakage. As the old lamps are removed for their sockets, they should be carefully packed to avoid breakage. The cartons supplied with the new lamps can be re-used for this purpose; alternatively, the lamp recycling service may be able to provide larger containers that will minimize the labor and handling involved. States have different

requirements regarding the number of broken lamps that can be accepted by recyclers and still qualify the shipment as a Universal Waste. Careful handling of waste lamps will therefore minimize disposal costs.

The services of a competent, properly licensed, recycling service for both lamps and ballasts is highly recommended for any retrofit project. It should be noted that the most significant environmental enforcement actions concerning incorrect handling of waste lamps and ballasts have involved lighting retrofits.

For more information specific to your state, consult the state-by-state stringency comparison, found elsewhere within the Lamp Recycling Outreach Project educational materials.

We also encourage you to set up recycling programs for the spent mercury-containing lamps in your own facilities.

For more information visit
www.lamprecycle.org
or
www.almr.org

Building Owners and Managers

Overview

Building owners and managers have a responsibility to manage the mercury-containing lighting that is used in most commercial properties. Whether you own the building or manage it for someone else, there is liability associated with improper lamp disposal. Fortunately, a recycling program is easy to set up to eliminate that liability.

What can owners/managers do?

The first step is to educate your employees. It is important that someone in each building understand what he or she can and cannot do with used lamps. Who makes "disposal decisions" for lighting in your building? Each building may be different. In some, the owner may directly control disposal decisions. In others, owners may delegate this authority to employees, contractors or service companies. Larger buildings may use energy management companies, electrical service contractors, lighting retrofit companies and even janitorial services to remove old lamps and install new ones. This is why it is important to get the relevant information to the "decision-maker."

Federal and State Rules

Disposal of mercury-containing lamps by businesses is regulated under the Universal Waste Rule (UWR). This rule prohibits most businesses from disposing of hazardous mercury-containing lamps in traditional municipal landfills. In nearly all situations, recycling is the only viable disposal option. The federal UWR imposes minimal requirements (no permitting is needed and no special tracking or reporting is required) if generators recycle lamps. Any lamp recycler can assist in setting up a program. For a list of recyclers see www.lamprecycle.org.

Ultimately, regulatory compliance remains the responsibility of the owner of the lamps. The owner is defined as the "generator" when lamps are spent and become hazardous waste. Owners are also "handlers" when they accumulate their own lamps. While there are exemptions in the federal rules for small generators, many states have more stringent rules. (See State Stringency Comparison, which compares state regulations with federal policies).

Massachusetts' Universal Waste Rule applies to all businesses and governmental agencies, but not waste generated from a household. The MA rule covers mercury-containing lamps (and other products) that fail the Federal Toxic Characteristic Leaching Procedure (TCLP) test. These lamps must be recycled at their end-of-life and managed according to specific regulations. Specially

formulated “low mercury” lamps with green end-caps (or green writing) can currently be managed as solid waste.

However, the new MA mercury management law enacted in 2006 imposes a ban on disposal of **ANY** products containing mercury, as of May 1, 2008. This ban will include “low mercury” lamps and will apply to mercury products from households as well.

In some states all mercury-containing lamps must be recycled. In other states the generator may be exempt due to volume of waste generated, but the lamps themselves are not exempt. Therefore, some buildings with multiple tenants could exceed minimum levels. An example of this is when multiple tenants share a common container for refuse. Enforcement agencies cannot distinguish different tenant’s lamps, and if the total exceeds the regulated amounts, the entire building and its owner are held responsible.

Owners and managers are encouraged to provide recycling options for occupants/tenants. Relationships with building maintenance, lighting, energy, and other contractors who service buildings can be developed, so the contractor knows the lamps from the building need to be separated from the rest of the solid waste and taken or shipped to commercial lamp recyclers throughout the country.

Incentives

Building owners should contact local public utilities and state/municipal tax authorities regarding rebates or tax credits for energy efficiency upgrades to buildings. When retrofitting with efficient mercury-containing lighting, some of the cost savings and credits may be used to offset recycling costs.

Setting up Recycling Services

Recycling services are provided by Association of Lighting and Mercury Recyclers (ALMR) member companies and other recyclers anywhere in the United States and its territories, Mexico and Canada. Services are available to large lamp users, small businesses, contractors, municipal government agencies and they are also available to households and the public through household waste collection programs. Either directly or through a network of transportation contractors, material can be picked up in any U.S. community. There are also a number of lighting, maintenance and other building contractors who will collect spent lamps and get them recycled for their customers.

Lamp collection programs can be designed for all generators:

- Small users can participate by using a “box program”, where a container is provided and when full it can be sent to any recycler via ground mail shipment. This is a prepaid program and labels and shipping papers are provided.

- For larger users, recyclers can arrange milk-run pick-ups and common carriers will transport lamps to accumulation facilities throughout the country, where they are consolidated for shipment to destination facilities.
- For very large generators, materials can be picked up in trailer loads as needed.
- There are numerous collection locations around the country that ship large quantities of lamps to recycling “Destination Facilities” (state authorized recyclers) every day.
- Recyclers typically provide customer services and containers, and will also arrange all aspects of getting lamps recycled for anyone who is interested.
- Individuals and small users can also take lamps to any locally operated household waste facility in their community. For a list of community programs see www.earth911.org

We also encourage you to set up recycling programs for the spent mercury-containing lamps in your own facilities.

For more information visit
www.lamprecycle.org
or
www.almr.org

Annex C: Messages for Target Audiences

Environmental Groups

Overview

Environmental organizations can play a crucial role in promoting the recycling of lamps that contain mercury. Through your traditional role in education and outreach you can be very helpful in communicating to the public about the dangers and health impacts of mercury pollution and the need to participate in lamp recycling programs. While our society strives to reduce energy consumption, most efficient lighting contains mercury. Even though the vast majority of mercury pollution comes from coal-fired power plants, mercury from broken spent lamps contributes somewhat to the environment.

We urge you to promote the many links to state-by-state resource information, and the www.lamprecycle.org and www.almr.org websites.

We also encourage you to include mercury and lamp recycling in your participation in the ongoing development of public policy initiatives at the national and state level. Your input into these issues is extremely important.

While businesses account for about 85% of the use of fluorescent lighting, households and individuals customers need to be educated as well, and informed about what they can do with their spent light bulbs.

Water issues

The Clean Water Act and The Safe Drinking Water Act set levels for mercury and empower agencies to set more stringent levels when waters are impaired from mercury. Levels are established as TMDLs, MCLs, NPDES permit caps, etc. So far, all national and state lamp regulations and disposal policies have been rooted in RCRA and the UWR. There are no specific regulations that address mercury-lamps in the context of water quality.[2]

[2] Aquatic Water Quality Standards- no single national standard. EPA has published "guidance values" or "criteria levels" for fresh and salt water. Per 40 CFR 131.36 the freshwater levels are 0.0021 mg/l for "criteria maximum" and 0.000012 mg/l for "criteria continuous." It is not clear whether any discharge is regulated at these levels, or whether they apply only to point source discharges subject to NPDES or other permit requirements. Additionally, EPA publishes a list of National Recommended Water Quality Criteria for Priority Toxic Pollutants which includes mercury at 0.0014 mg/l "maximum" and 0.00077 mg/l "continuous". Again, it is not clear how these criteria apply to any given source. EPA uses 0.00005 mg/l for human consumption levels. US EPA Reference concentration for mercury is 0.0003mg/m3, based on central nervous system effects after inhalation.

There are still about 500 million mercury lamps per year put into some type of solid waste container and managed as municipal solid waste. Container can mean a small “garbage” can typically found in janitor closets, dumpsters, roll-off and other truck-loaded containers typically found outside commercial buildings, compactors, hauling trucks, and more.

At some point all of these lamps break. General belief is that most of the breakage occurs in the container, as opposed to at the landfill, due to the fragile glass and compacting that occurs in containers. When these containers are also exposed to moisture from rain or other sources and they leak, or when they are washed out, mercury enters the environment. One experiment done to attempt to quantify this mercury/water pathways suggests that any mercury-containing lamp, including lamps sold as “low mercury” or TCLP-passing, when broken in solid waste containers with enough water is present to escape the container, will leach detectable and possibly unacceptable amounts of mercury into the environment.

For more information visit
www.lamprecycle.org
or
www.almr.org

Annex C: Messages for Target Audiences

Solid Waste Industry

Basic Information

As a solid waste manager, you are in a position to understand the dangers to public health and the environment of disposing of mercury-containing devices in the trash. You are also in a key position to implement change through the creation and support of mercury lamp recycling programs.

In working to effect these changes, solid waste managers need some basic information in order to persuade audiences that they would target for mercury-containing lamp collection and recycling.

Mercury is an essential ingredient for most energy efficient lamps. Fluorescent lamps (including compact fluorescent) and high intensity discharge (HID) lamps are the two most common types of mercury-containing lamps. Fluorescent lamps provide lighting to most schools, hospitals, office buildings and stores. HID lamps include mercury vapor lamps, metal halide and high-pressure sodium lamps, and are used for streetlights, floodlights, parking lots, and industrial lighting.

Fluorescent and HID lamps can contain enough mercury to be considered hazardous. Since these lamps are fragile, they often break during collection and disposal. This raises issues regarding potential employee exposures and water quality issues from discharges from containers that store these broken lamps. It should also be noted, the quantities of mercury that end up in landfills due to regulatory exemptions or not recycling lamps can result in small quantities of mercury in the leachate and landfill gas.

Federal and State Rules

According to the Subtitle C portion of the Resource Conservation and Recovery Act (RCRA) and the Code of Federal Regulations, 40 CFR Part 260-273, it is a violation to transport and dispose of certain mercury-containing lamps in a municipal solid waste facility (landfill, MRF, WTE facility or transfer station). They can, according to these same regulations, be recycled with less stringent requirements, under the Universal Waste Rule. If mercury-containing lamps are improperly disposed of in municipal solid waste systems, there are liabilities for the facility that accepts this material and for the party collecting and transporting the material.

The regulatory framework regarding recycling and disposal of mercury containing lamps is confusing because states have different (and potentially stricter) regulations, and lamps have different mercury contents. There are also

exemptions from the hazardous waste disposal requirements under the Federal law and regulations for households and Conditionally Exempt Small Quantity Generators (CESQG). So, just because lamps are found in a load arriving at a solid waste facility does not necessarily mean that a violation has occurred.

It's difficult to keep hazardous lamps out of the MSW waste stream because enforcement is difficult, distinguishing hazardous lamps is difficult and exemptions to Subtitle C handling do exist. The easiest way to manage mercury-containing lamps is to recycle them according to the Universal Waste Rule provisions, as applicable in each State.

The Universal Waste Rule makes lamp recycling easier on at least two levels. First, it creates less stringent standards for storing and reporting. Secondly, because of the reduced level of regulation, Bill of Lading and common carriers can be used to transport intact lamps to recycling facilities. **This creates an opportunity for solid waste haulers to provide a new service to existing customers.**

What to Do?

Solid waste haulers/collectors:
What solid waste haulers/collectors can do is encourage recycling of mercury-containing lamps. To accomplish this haulers need to comply with the Universal Waste Rule and applicable state standards, which means that they should not collect and transport lamps to municipal solid waste facilities. They should consider establishing lamp collection for recycling program as a service: either picking up or establishing a drop off (a fee can be charged). Once this is established, they can train sales representatives on how to educate customers and provide customers with suggestions on how to handle lamps in their workplace and options for recycling their lamps. This could include providing lamp containers for solid waste customers and a collection service to meet with customers schedules.

Facility Operators:
One of the more important things that facility operators can do is to ensure that the facility's protocols for screening each load include information about identifying mercury-containing lamps. These protocols describe what should be done if a hazardous load arrives at the facility. If the type and quantity of lamps places the load in this category, these protocols should be followed. The key is to communicate to haulers who bring the materials to the facility that mercury containing lamps are not accepted and should be recycled rather than being brought to the solid waste facility.

Solid Waste Agencies:
Solid waste agencies that are responsible for managing solid waste have an obligation to make sure that the laws pertaining to mercury-containing lamps are being complied with through permit requirements and inspections. But, they also have a responsibility to encourage recycling. This may be done through education

and outreach or by providing recycling (either directly or through a private company) in compliance with the Universal Waste Rule and applicable state standards.

We also encourage you to set up recycling programs for the spent mercury-containing lamps in your own facilities.

For more information visit
www.swana.org
or
www.lamprecycle.org
or
www.almr.org

Annex C: Messages for Target Audiences

Specifiers of Energy-efficient Lighting

Overview

Any designer or engineer who specifies energy-efficient lighting for buildings can assist owners with lamp recycling decisions. Since you interface with building owners, contractors, and electrical distributors in the course of your design and commissioning work on buildings, it is important for you to have an understanding of the regulations that apply to these groups, and to the end-of-life management of the energy-efficient lamps you specify.

In the US, most States have adopted a less burdensome set of regulations for dealing with hazardous waste lamps (typically mercury-containing fluorescent and HID types), by including them in the Universal Waste Rule (UWR.) If lamps are sent for recycling, this rule simplifies the storage, record keeping and transportation requirements compared to handling them as hazardous wastes.

Distributors, contractors, and distributors may have some level of involvement in the disposal of used (spent) mercury-containing lamps. For example, the wholesale distributor who purchases and supplies lamps for your projects may offer lamp recycling “box programs” to the contractor or building owner. The contractor not only installs lamps, but also may be involved in the ongoing maintenance and disposal of those lamps at end of life. The building owner may employ a facility manager who oversees the final disposition of used lamps.

Lighting Retrofits

As a specifier, you are frequently involved in the selection of efficient lamps for retrofits. Any lighting retrofit will generate a large number of waste lamps. These components contain some combination of mercury, cadmium, antimony and lead. Environmental considerations demand that everyone involved in a lighting retrofit project pay close attention to proper disposal.

In the US, if these products classify as hazardous waste, it is the responsibility of the *owner* to manage the waste correctly; and any *contractors* involved share that *legal responsibility.* While specifiers have no specific legal responsibility for end-of-life management of the lamps they recommend (except for lamps in their own facilities), you can be influential in assisting customers with recycling options.

Other Jurisdictions

The Canadian Provinces have similar concerns about environmentally responsible lamp disposal. Lamp recyclers are also available in Canada. The www.lamprecycle.org. website has information on lamp disposal and recyclers in Canada. Mexico has passed a version of the US UWR, which includes mercury-containing lamps. Implementation is the responsibility of the 31 States. Details are not yet available.

Lamp Breakage

The major exposure to mercury in lamps arises from lamp breakage. As the old lamps are removed for their sockets, they should be carefully packed to avoid breakage. The cartons supplied with the new lamps can be re-used for this purpose; alternatively, the lamp recycling service may be able to provide larger containers that will minimize the labor and handling involved. States have different requirements regarding the number of broken lamps that can be accepted by recyclers and still qualify the shipment as a Universal Waste. Careful handling of waste lamps will therefore minimize disposal costs.

The services of a competent, properly licensed, recycling service for both lamps and ballasts is highly recommended for any retrofit project. It should be noted that the most significant environmental enforcement actions concerning incorrect handling of waste lamps and ballasts have involved lighting retrofits.

For more information specific to your state, consult the state-by-state stringency comparison, found elsewhere within the Lamp Recycling Outreach Project educational materials.

We also encourage you to set up recycling programs for the spent mercury-containing lamps in your own facilities.

For more information visit
www.lamprecycle.org
or
www.almr.org

Annex C: Messages for Target Audiences

Local Government Agencies

Overview

This message is for local government agencies such as

- Environmental agencies
- Health agencies
- Public Works agencies
- Solid Waste Management agencies
- Building, inspection, licensing and permitting agencies

Local government agencies throughout the country can contribute to the effort to increase mercury lamp recycling. Businesses and the public often contact local government first with questions about how to manage waste materials. Citizens may call and ask, *"I know I shouldn't throw my _____ away, but what can I do?"* Throughout the country there are more and more "green business" programs in which local agencies provide assistance to local businesses for storm water management, refuse recycling, energy usage and efficiency, contingency planning, etc. Many agencies have Cooperative Agreements or Memoranda of Understanding with state regulators for implementation and/or enforcement of environmental policies and receive funding for these activities.

What local agencies can do to increase lamp recycling

Local governments can offer and advertise Household Hazardous Waste (HHW) program availability for mercury lamps for individuals and small businesses, also known as Conditionally Exempt Small Quantity Generators (CESQGs). You can also set up other collection points, use local contractors or HW firms who manage HHWs to make recycling more available to businesses.

Local agencies that do building inspections can add lamps to the checklist of compliance items. Start by asking the question "what are you doing with your used mercury-added lamps?" Then, give them the information they need to set up a recycling program.

Solid waste franchise agencies can encourage or require Solid Waste contractors to set up active diversion programs, by providing lamp containers for shipment to recyclers. There is a strong need to provide diversion options for solid waste customers. Containers are available for anyone from any lamp recycling company.

Encourage participation in "green building" programs, energy efficiency programs, lighting retrofits, Rebuild America, EPA's Energy Star program and the Green Building Council. Local governments can encourage energy efficient lighting in

general and at the same time think about and encourage the recycling of the lamps that are replaced in buildings.

In conclusion, we encourage you to promote lamp-recycling programs -- and to set up recycling programs for the spent mercury-containing lamps in your own facilities.

For more information visit
www.lamprecycle.org
or
www.almr.org

Annex C: Messages for Target Audiences

Utilities

To be written

Annex D

Massachusetts Lamp Recycling Rate Calculation Procedure

Background Information on Lamp Recycling Rates

A lamp-recycling rate for any given year is calculated by dividing the number of lamps recycled that year (the numerator) by the total number of lamps expiring that year (the denominator).

Since 2001, the Association of Lighting and Mercury Recyclers (ALMR) and the National Electrical Manufacturers Association (NEMA) have joined together to publish a national recycling rate for mercury-containing lamps. Both organizations collect data annually, with ALMR providing the numerator, and NEMA providing the denominator, using national sales data from five years previous to the recycling date. The lamp sales data are actually a rolling average of sales units from 4, 5, and 6 years previous to the recycling date, since the bulk of mercury-containing lamps are fluorescent types that last, on average, 4 to 6 years. To quote the ALMR press release of November 2004, "Lamp manufacturers and recyclers believe this is a reasonable portrayal of the national lamp recycling rate, and it is our best professional judgment of the lamp recycling market."

NEMA seeks to base the Massachusetts lamp-recycling rate on a similar method to that used by ALMR and NEMA since 2001 for their national recycling rate. Since lamp sales records are not kept on a state-by-state basis, industry must develop a specific survey to determine Massachusetts' lamp sales in order to provide a robust starting point. The first year for which accurate sales data of this sort can be obtained is 2006. While this can be done, we must recognize that the first target year for a Massachusetts recycling rate is 2008, requiring that we obtain Massachusetts sales data for 2002, 2003, and 2004 in order to be consistent with our current methodology. Data for these years is not available for Massachusetts, and, therefore, must be calculated based on 2006 data.

What follows is our method for surveying and calculating in order to achieve a reasonable and defensible Massachusetts lamp recycling rate.

As described below, this method proposes a three-year survey, starting in 2006, of Massachusetts-only unit sales of mercury-added lamps. We believe this method will establish an excellent baseline and will work very well for determining the denominator of the recycling rate calculation for 2008. After the initial three-year survey, NEMA and the MassDEP will evaluate the need to continue the Mass-only survey on a year-by-year basis. If there is little variance year-to-year on a percentage basis, NEMA can apply the consistent Mass percentage to the National Numbers and will evaluate, with MassDEP, continuing the state-specific survey on a less frequent basis going forward.

In summary, the Massachusetts lamp recycling rate will be calculated by dividing the annual # of lamps recycled from Massachusetts (obtained from ALMR) by the annual # of lamps sold in Massachusetts 5 years previously (obtained from NEMA and other lamp manufacturer surveys).

Massachusetts Lamp Recycling Rate Calculation

1 By March 31st, 2007, NEMA will develop a survey to collect data on all mercury-containing lamps sold in Massachusetts in 2006. The survey will encompass all 15 NEMA lamp manufacturers plus any non-NEMA manufacturers selling in MA that have joined in the NEMA lamp recycling educational plan. This will provide the most accurate number to use in calculating the aforementioned denominator. NEMA will conduct this survey for at least three years, providing data for 2006, 2007, and 2008, at a minimum. After the initial three-year period, NEMA and the MassDEP will evaluate the necessity of conducting the state survey on a yearly basis going forward.

2. Companies are due to submit their proprietary sales data from the first survey to NEMA by June 1st, 2007. NEMA will aggregate the company-specific data to develop a total number of mercury-containing lamps sold in MA in 2006.

3. NEMA annually collects sales information on a national basis, but not typically on a State-by-State basis. To enable an estimate of total sales in Massachusetts, the survey data total will be divided by the number of mercury-containing lamps sold in the United States in 2006. The resulting percentage will then be used as follows.

4. Mercury-containing lamps have an average life of 4 to 6 years. Lamps expected to expire in 2008 will have been sold in 2002, 2003 or 2004. NEMA will average national sales data on mercury-containing lamps from 2002, 2003, and 2004 to produce an estimate of the number of lamps expected to expire in 2008. This figure will be multiplied by the previously calculated Mass percentage of mercury-containing lamps to determine what portion of that total can be expected to expire in MA. NEMA will provide the total 2008 expiring mercury-containing lamp number to MassDEP by March 31st, 2009. NEMA will provide a new number for each year necessary in determining recycling rate goal.

5. By January 31st, 2009, ALMR will develop a survey to collect data on the number of lamps recycled from the Commonwealth of Massachusetts in 2008. All companies that recycle lamps from MA are to be surveyed. ALMR will employ a proprietary survey to collect individual company data by March 31, 2009 and will send the total number calculated to MassDEP. ALMR will provide a new number for each year necessary in determining recycling rate goal.

6. MassDEP will use NEMA lamp manufacturer data on the annual number of lamps expected to expire in MA, as well as ALMR data on the annual number of lamps recycled in MA, to calculate and certify the MA lamp-recycling rate for each year.